

INVESTIGATION OF THE RADICAL COPOLYMERIZATION OF POLY(PROPYLENE) GLYCOL MALEATE PHTHALATE WITH SODIUM METHACRYLATE

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Unsaturated polyester resins, being an inexpensive raw material, represent a considerable interest because of their wide practical application [1], so the actual task is a synthesis of new copolymers on their basis, having a set of useful properties.

In this paper, we investigated the copolymerization of poly(propylene) glycol maleate phthalate (p-PGMP) with sodium methacrylate (Na-MAA) dissolved in water in a ratio of 1:2. The reaction was carried out in dioxane at a temperature of 333 K in the presence of a radical-forming initiator, benzoyl peroxide, at various initial molar ratios of comonomers. The kinetics of radical copolymerization of p-PGMP with Na-MAA was studied by dilatometric method. The degree of unsaturation of the synthesized copolymers was determined by the bromide-bromate method [2]. The compositions of the copolymers were established by analyzing the mother liquors of the copolymers by gas chromatography [3].

The kinetic data indicate an increase in the reaction rate with an increase in the mole fraction of Na-MAA, which correlates well with the yield of copolymers, their degree of unsaturation, and swelling capacity. The yield of copolymers and the swelling degree antitate to the content of p-PGMP, on the contrary, an increase in the Na-MAA content of the initial mixture leads to a decrease in the degree of unsaturation of the copolymers. On the basis of the copolymer compositions, the constants and parameters of copolymerization were determined by the Mayo-Lewis method, indicating the preferential course of the cross-linking and branching reactions due to the preferential interaction of the Na-MAA radical with its "own" radical, and the p-PGMP with the "stranger". It was found that p-PGMP is less reactive than Na-MAA.

References:

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